

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY****SAULT STE. MARIE, ONTARIO**

Sault College

**COURSE OUTLINE**

**COURSE TITLE:** Human Factors in Aviation

**CODE NO. :** AVT119-2                      **SEMESTER:** One

**PROGRAM:** Aviation Technology (Flight)

**AUTHOR:** Brian Stewart

**DATE:** May/09              **PREVIOUS OUTLINE DATED:** New

**APPROVED:**

	CHAIR	DATE
<b>TOTAL CREDITS:</b> 2		
<b>PREREQUISITE(S):</b> None		
<b>HOURS/WEEK:</b> 2		

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## I. COURSE DESCRIPTION:

Students enrolled in the aviation technology (flight) program will participate in 3 human factor courses. This, the first course, provides an introduction to human factors with a focus on basic flight physiology. You will learn why human factors are so important and the role they will play in your career. The topics covered include: basic human anatomy, hearing, vision, altitude physiology, the atmosphere, sleep and circadian rhythms, stress, situational awareness and orientation, acceleration and motion sickness.

## II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course the student will demonstrate the ability to:

1. Define human factors and its importance to aviation

### Potential Elements of the Performance:

- Define human factors and flight physiology
- Role in aviation
- The components of human factors described by the "SHEL" model.

2. Describe the basic function of the human body

### Potential Elements of the Performance:

- The nervous system
- The body's framework
- The digestive system
- The metabolic system
- The circulatory system

3. Describe the atmosphere

### Potential Elements of the Performance:

- Composition and characteristics of the atmosphere
- Atmospheric effect on gases
- Physiological divisions of the atmosphere

4. Understand what is required to maintain your situational awareness

### Potential Elements of the Performance:

- What is situational awareness
- What is required to maintain situational awareness
- Signs of losing situational awareness
- Prevention

5. Explain the effect of the atmosphere on the body's functions

### Potential Elements of the Performance:

- Respiration

- Hypoxia, types, stages, symptoms, factors affecting your susceptibility, prevention and treatment
  - Carbon monoxide poisoning
  - Decompression
  - Trapped gases
  - Evolved gases
6. Explain the role of hearing and the vestibular apparatus and the effect of vibrations

Potential Elements of the Performance:

- Anatomy of the ear
  - Sound, hearing and hearing loss
  - The effect of vibration on the body
  - The relationship of the inner ear and orientation
  - Types and causes of disorientation
  - Vestibular illusions
7. Explain how the eye works and it's role in orientation

Potential Elements of the Performance:

- Anatomy of the eye
  - Night vision
  - Factors affecting visual acuity
  - Scanning for objects
  - Visual illusions and their affect on orientation
  - Vision and motion sickness
  - Eye protection
8. Realize the significance of the role your health plays in the safe outcome of the flight

Potential Elements of the Performance:

- Dangers of self diagnosis
  - Over the counter medications
  - Caffeine and it's effects
  - Smoking, alcohol and drugs
9. Realize the significance of environmental stresses and their effect on performance and flight safety

Potential Elements of the Performance:

- Temperature control, coping with the extremes
- Dehydration and air quality
- Importance of stress
- Types of stress
- Strategies to reduce, prevent or control stress

10. To deal with fatigue, understand the importance of rest and the effects of jet lag for long range flights

Potential Elements of the Performance:

- Sleep
- Circadian rhythms and jet lag
- Fatigue, symptoms and coping

11. Cope with accelerations and motion sickness in flight

Potential Elements of the Performance:

- Situations in civilian flying
- Tolerance to "G" forces
- Causes of motion sickness and some suggestions to reduce your susceptibility

### III. TOPICS:

1. Introduction to human factors
2. Basic human anatomy
3. Atmosphere
4. Situational awareness
5. Altitude physiology
6. Hearing and vibrations
7. Vision
8. Orientation
9. Stress - medical stress and environmental stress
10. Sleep
11. Acceleration and motion sickness

### IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. Basic Flight Physiology 3<sup>rd</sup> edition – Reinhart

### V. OTHER RESOURCES/TEXTS/MATERIALS:

1. From the Ground Up
2. [A.I.M. – aeronautical information manual](#)
3. Human Factors for Flight – Frank H Hawkins (Second Edition)
4. Human Factors for General Aviation – Stanley Trollip & Richard Jensen  
Jeppesen Sanderson
5. Aviation Safety Programs – Jeppesen Sanderson
6. Human Factors in Aviation – Earl L Wiener, David C Nagel
7. Pilot Judgement and Crew Resource Management – Richard S Jensen
8. Flight Safety – A Primer for General Aviation Pilots Alexander T Wells
9. Human Factors for Aviation – Basic Handbook – Transport Canada
10. Pilot – Mental and Physical Performance – David C Edwards
11. Beyond Aviation Safety Human Factors – Daniel E Maurino, James Reason, Neil Johnston, Rob B Lee

12. Flightdeck Performance – Stanley Roscoe
13. Redefining Airmanship – Tony Kern
14. Flight Discipline – Tony Kern

Web Links:

<http://www.psy.utexas.edu/psy/helmreich/nasaut.htm>

<http://www.hf.faa.gov/>

<http://www.crm-devel.org/resources/human.htm>

[http://www.flightsafety.org/about\\_fsf.html](http://www.flightsafety.org/about_fsf.html)

<http://www.tc.gc.ca/civilaviation/aviationsafety/menu.htm>

## VI. EVALUATION PROCESS/GRADING SYSTEM:

The student will be assessed by a combination of attendance and deportment, quizzes, tests and a final exam. Weighting of each will be as follows: 20% for quizzes, 40% for all tests prior to the final exam and 40% for the final exam. A minimum mark of 70% is required to pass the course. Make-up tests are not permitted except in accordance with section VII of this outline.

- Unexcused absences will result in 2% deduction of the final mark for each occurrence, arriving for class late will result in a 1% deduction of the final mark for each occurrence, and violations of the dress code will result in a 1% deduction of the final mark for each occurrence. Refer to the SOP GEN 1.3.1.8 for dress code policies and SOP GEN 1.3.1.13 for the policy regarding absence or tardiness.
- Quizzes will be given without prior notice.
- If it is necessary to write a second final exam in order to pass the course, the highest grade achievable will be a "C". (See make-up policy in section VII)
- Students may request a deferment of a test for compassionate reasons. Compassionate Grounds for deferment will include but not be limited to death of an immediate family member, personal illness, or recent diagnosis of a serious illness of a family member. **Make-ups will not be permitted after the fact for compassionate reasons.**
- "F" grades in any subject at the end of a semester will result in termination from the Aviation program.
- Although attitude, co-operation, etc., are not graded, students may be terminated based on their performance in this area (see section VII). These attributes are also considered in the selection of the Air Canada Award and other scholarships.
- Dates of tests will be announced at least 1 week in advance.
- A classroom code of conduct can be found in the SOP General section, and will be adhered to.

The following semester grades will be assigned to students in this course:

Grade	Definition	Grade Point <u>Equivalent</u>
A+	90 - 100%	4.00
A	80 - 89%	
B	70 - 79%	3.00
C	assigned if a make-up exam was required to complete the course	2.00
F (Fail)	below 70%	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in non-graded subject area or flight training.	
U	Unsatisfactory achievement in non-graded subject area or flight training.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

## VII. SPECIAL NOTES:

### Attitude and Conduct:

Attitude plays an important role in your ability to exercise good judgment. Although attitude is not being graded, it affects your ability to learn as well as your safety as a student and future as a professional pilot. Students who display a strong tendency towards any of the five hazardous attitudes pose a grave risk to themselves and others. For this reason these students will be counseled and may be placed on probation. If this is ineffective, then sanctions or involuntary withdrawal may be the only recourse.

The five hazardous attitudes are identified as Anti-authority, Impulsivity, Invulnerability, Machismo, and Resignation. These hazardous attitudes are described in “Human Factors for Aviation – Basic Handbook” on pages 151 and 152.

### Make-up Policy:

- No make-ups on tests occurring prior to final exams.
- No make-ups on quizzes.
- If the final grade achieved for this course is less than 70%, a second final exam may be written at the discretion of the professor for this course. The second exam will be averaged with the first exam to determine the resulting exam mark, and the final grade will then be calculated.
- In the event that a second final exam is required, the highest achievable overall grade for this course will be a C
- Any student that requires 100% or greater on a make-up exam to pass the course will not be allowed to write a make-up exam.

### Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

### Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

### Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

Substitute course information is available in the Registrar's office.

### Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

### Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

### Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade “C”, (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

### Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations, in addition to announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more. Go to <https://my.saultcollege.ca>.

### Electronic Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session. *Refer to section VI Evaluation Process/Grading System of this course outline for further details on specific attendance requirements for this course.*

## Tuition Default:

Students who have defaulted on the payment of tuition (tuition has not been paid in full, payments were not deferred or payment plan not honoured) as of the first week of November will not be allowed to attend class and will be removed from the flight and simulator training schedule until such time as tuition payment has been arranged with Financial Services. This may result in incomplete course work and a delay in completion of the flight training. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.